

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. – 7. (Canceled)

8. (Currently Amended) A plasma processing apparatus comprising:
a vacuum processing chamber for processing a sample, including an insulator film, by using plasma;
an outer chamber connected with an evacuation means;
a gas supplying unit for introducing into the vacuum processing chamber a fluorine-containing processing gas;
an upper electrode and a lower electrode for generating plasma therebetween and providing the vacuum processing chamber;
an electrode cover comprised of silicon being provided at the outer surface of the upper electrode; and
a discharge confining means for surrounding the vacuum processing chamber, wherein said discharge confining means is made of silicon SiC.

9. (Previously Presented) The plasma processing apparatus according to claim 8; the lower electrode having a sample mounting surface; said apparatus further comprising a susceptive cover comprised of silicon near the sample mounting surface.

10. (Currently Amended) A plasma processing apparatus comprising:

a vacuum processing chamber for processing a sample, including an insulator film, by using plasma;

a gas supplying unit for introducing into the vacuum processing chamber a fluorine-containing processing gas;

an upper electrode and a lower electrode for providing the vacuum processing chamber therebetween;

a high frequency electric power source for supplying a high frequency energy for generating plasma between the upper electrode and the lower electrode;

a bias electric power source connected to the lower electrode to control energy of ions in the plasma;

an electrode cover comprised of silicon being provided at the outer surface of the upper electrode;

a susceptive cover comprised of silicon being provided near a sample mounting surface of the lower electrode; and

a discharge confining means for surrounding the vacuum processing chamber, wherein said discharge confining means is made of silicon SiC;

wherein an inner surface of the vacuum processing chamber is substantially constituted by surfaces of silicon except for the sample mounting surface.

11. (Previously Presented) The plasma processing apparatus according to claim 10, further comprising an outer chamber located outside of the vacuum processing chamber and connected with an evacuation means.

12. (Previously Presented) The plasma processing apparatus according to claim 10, wherein the discharge confining means includes at least a gap for evacuating the processing gas from the vacuum processing chamber to the outer chamber.

13. (Previously Presented) The plasma processing apparatus according to claim 8, wherein the discharge confining means is ring-shaped.

14. (Previously Presented) The plasma processing apparatus according to claim 9, wherein the discharge confining means is ring-shaped.

15. (Previously Presented) The plasma processing apparatus according to claim 10, wherein the discharge confining means is ring-shaped.

16. (Previously Presented) The plasma processing apparatus according to claim 8, wherein the discharge confining means is provided with at least a gap for evacuating the processing gas from the vacuum processing chamber to the outer chamber.

17. (Previously Presented) The plasma processing apparatus according to claim 9, wherein the discharge confining means is provided with at least a gap for evacuating the processing gas from the vacuum processing chamber to the outer chamber.

18. (Previously Presented) The plasma processing apparatus according to claim 13, wherein the discharge confining means is provided with at least a gap for evacuating the processing gas from the vacuum processing chamber to the outer chamber.

19. (Currently Amended) A plasma processing apparatus comprising:
a vacuum container for processing a sample including an insulator film by use of plasma;
a gas supplying unit for introducing into the vacuum container a processing gas containing fluorine;
an upper electrode and lower electrode having plasma generated therebetween;
an electrode cover made of silicon provided at the bottom surface of the upper electrode; and
a discharge confining means made of SiC defining a vacuum processing chamber in the space between said upper and lower electrodes electrodes; and
~~wherein both said electrode cover and said discharging confining means are made of silicon.~~

20. (previously presented) The plasma processing apparatus according to claim 19:

wherein said lower electrode includes a sample mounting surface, and further comprising a susceptive cover around the sample mounting surface, and wherein said susceptive cover is also made of silicon.

21. (Currently Amended) A plasma processing apparatus comprising:

a vacuum container for processing of a sample including an insulator film through the use of plasma;

a gas supplying unit for introducing into the vacuum container a processing gas containing fluorine;

an upper electrode and lower electrode for defining a vacuum processing chamber therebetween;

a high frequency electric power source for supplying a high frequency energy for generating plasma in the vacuum processing chamber;

a bias electric power source connected to the lower electrode to control the energy of ions in the plasma;

an electrode cover made of silicon being provided at the bottom surface of the upper electrode;

a susceptive cover made of silicon provided around a sample mounting surface of the lower electrode; and

a discharge confining means made of SiC for surrounding the vacuum processing chamber-chamber; and

~~wherein the electrode cover, susceptive cover, and discharge confining means are all made of silicon.~~

22. (Previously Presented) The plasma processing apparatus according to claim 21 further comprising an outer chamber defined within the vacuum container outside of the vacuum processing chamber, said outer chamber being connected with an evacuation means.

23. (Previously Presented) The plasma processing apparatus according to claim 21 wherein the discharge confining means includes at least a gap for evacuating the processing gas from the vacuum processing chamber to the outer chamber.

24. (Previously Presented) The plasma processing apparatus as in claim 19 wherein the discharge confining means is ring shaped.

25. (previously presented) The plasma processing apparatus according to claim 19 and further comprising an outer chamber defined in said vacuum container outside of said vacuum processing chamber and wherein the discharge confining means is provided with at least a gap for evacuating the processing gas from the vacuum processing chamber to the outer chamber.

26. (Cancelled)

27. (currently amended) A plasma etching apparatus comprising:
a vacuum container for processing a sample including an insulator film by use of plasma;

an upper electrode and lower electrode having plasma generated therebetween;

wherein said plasma etching apparatus further comprises:

a gas supplying unit for introducing into the vacuum container a processing gas containing fluorine;

means for generating a plasma between said upper electrode and lower electrode to etch a fine pattern of 0.2 μ m or smaller on the sample having a diameter of 300 mm or more;

a bias electric power source connected to the lower electrode to control energy of ions in said plasma;

a discharge confining means defining a vacuum processing chamber in the space between said upper and lower electrodes wherein the discharge confining means is made of silicon SiC;

an electrode cover provided at the bottom surface of the upper electrode, wherein the electrode cover is made of silicon and includes holes to pass the processing gas;

a susceptive cover, made of silicon, provided around a sample mounting surface of the lower electrode.

28. (currently amended) A plasma etching apparatus comprising:

a vacuum container for processing a sample including an insulator film by use of plasma;

an upper electrode and lower electrode having plasma generated therebetween;

wherein said plasma etching apparatus further comprises:

 a gas supplying unit for introducing into the vacuum container a processing gas containing fluorine;

 means for generating a plasma with a density of $5 \times 10^{10} \text{ cm}^{-3}$ to $5 \times 10^{11} \text{ cm}^{-3}$ between said upper electrode and lower electrode to etch a fine pattern of $0.2 \mu\text{m}$ or smaller on the sample having a diameter of 300 mm or more;

 a bias electric power source connected to the lower electrode to control energy of ions in said plasma;

 a discharge confining means defining a vacuum processing chamber in the space between said upper and lower electrodes wherein the discharge confining means is made of ~~silicon~~ SiC;

 an electrode cover provided at the bottom surface of the upper electrode, wherein the electrode cover is made of silicon and includes hole to pass the processing gas; and

 a susceptive cover made of silicon provided around the sample mounting surface of the lower electrode.